

**REMARKS**

The Official Action mailed July 23, 2009, has been received and its contents carefully noted. This response is filed within three months of the mailing date of the Official Action and therefore is believed to be timely without extension of time. Accordingly, the Applicant respectfully submits that this response is being timely filed.

The Applicant notes with appreciation the consideration of the Information Disclosure Statements filed on June 23, 2006, and January 23, 2008.

Claims 1-27 are pending in the present application, of which claims 1-3, 7-9, 13-15 and 19-21 are independent. Claims 1-3 and 7-9 have been amended to better recite the features of the present invention. For the reasons set forth in detail below, all claims are believed to be in condition for allowance. Favorable reconsideration is requested.

Paragraph 2 of the Official Action rejects claims 1-5 and 25-27 as obvious based on the combination of JP 10-310574 to Kitahora, U.S. Publication No. 2001/0022497 to Aoki and U.S. Publication No. 2005/0098207 to Matsumoto. The Applicant respectfully traverses the rejection because the Official Action has not made a *prima facie* case of obviousness.

As stated in MPEP §§ 2142-2144.04, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some reason to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the

art.” In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

The prior art, either alone or in combination, does not teach or suggest all the features of the independent claims. Independent claims 1-3 recite an aryl group having 6 to 25 carbon atoms. Also, in claims 1-3, general formulas (1) and (2) include an amine. Further, claims 1-3 recite “a carbazole derivative represented by a general formula (1) and an inorganic compound exhibiting an electron accepting property with respect to the carbazole derivative represented by the general formula (1)” and dependent claim 26 recites “wherein the inorganic compound is one or more kinds of titanium oxide, vanadium oxide, molybdenum oxide, tungsten oxide, rhenium oxide, ruthenium oxide, chromium oxide, zirconium oxide, hafnium oxide, tantalum oxide and silver oxide.” For the reasons provided below, Kitahora, Aoki and Matsumoto, either alone or in combination, do not teach or suggest the above-referenced features of the present invention.

The Official Action asserts that “Kitahora et al. discloses ...  $R^1$  = aryl group having 25 carbon atoms ...  $Ar^2 = Ar^3$  = aryl group having 6 carbon atoms” (pages 2-3, Paper No. 20090709). However, Kitahora does not appear to teach or suggest an aryl group having 6 to 25 carbon atoms.

Also, the Official Action asserts that paragraph [0159] of Matsumoto discloses the claimed amine (see general formulas (1) and (2) of the present claims). However, paragraphs [0159] and [0160] of Matsumoto do not, in fact, appear to teach or suggest the claimed amine.

Further, the Official Action asserts that “Aoki et al. discloses the use of vanadium oxide ... to improve hole-injecting properties of a hole-injecting layer in an organic EL device ([0095])” (page 3, Id.). However, Aoki appears to teach that vanadium oxide is used in a photocatalyst-containing layer (paragraphs [0093]-[0095]). Therefore, it is not clear how Aoki’s teachings relating to vanadium oxide used in a photocatalyst-

containing layer supports the alleged modification of Kitahora, i.e. "to add vanadium oxide as disclosed by Aoki et al. to the hole-transporting/injecting layer of the light-emitting element that contains the carbazole derivative as disclosed by Kitahora et al." (page 3, Id.).

Therefore, the Applicant respectfully submits that Kitahora, Aoki and Matsumoto, either alone or in combination, do not teach or suggest the above-referenced features of the present claims.

Since Kitahora, Aoki and Matsumoto do not teach or suggest all the claim limitations, a *prima facie* case of obviousness cannot be maintained. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

Paragraph 3 (first occurrence) of the Official Action rejects claim 6 as obvious based on the combination of Kitahora, Aoki, Matsumoto and U.S. Publication No. 2005/0067951 to Richter. Paragraph 4 of the Official Action rejects claims 12 and 18 as obvious based on the combination of Kitahora, Aoki, Matsumoto, Kanamaru and Richter. Paragraph 6 of the Official Action rejects claim 24 as obvious based on the combination of Kitahora, Aoki, Matsumoto, Kawamura and Richter. The Applicant respectfully traverses the rejection because the Official Action has not made a *prima facie* case of obviousness.

There is no proper or sufficient reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Kitahora, Aoki, Matsumoto and Richter or to combine reference teachings to achieve the claimed invention. MPEP § 2142 states that the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. It is respectfully submitted that the Official Action has failed to carry this burden. While the Official Action relies on various teachings of the cited prior art to disclose aspects of the claimed invention and asserts that these aspects could be modified in the manner asserted in the Official Action, it is submitted that the Official Action does not adequately set forth why one of

skill in the art would combine the references to achieve the features of the present invention.

The Official Action first relies on Kitahora to teach carbazole (19) (page 3, Id.). The Official Action concedes that Kitahora, Aoki and Matsumoto do not disclose “a carbazole derivative where  $R^2$  has a structure of general formula (2) in which  $Ar^1$ ,  $Ar^2$ , and X have the same substituents as  $Ar^4$ ,  $Ar^5$ , and Y, respectively” (page 5, Id.), “a carbazole derivative where  $R^2$  has a structure of general formula (4) in which  $Ar^1 = Ar^2$ ” (page 10, Id.), or “a carbazole derivative where  $R^2$  has a structure of general formula (104)” (page 16, Id.). The Official Action relies on Richter to allegedly teach a carbazole (23) (pages 5, 10-11 and 16-17, citing page 9 of Richter). Without any specific references to Kitahora, Aoki, Matsumoto or Richter in support and without establishing the level of ordinary skill in the art at the time of the present invention, the Official Action asserts that “[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to likewise modify the carbazole derivative as disclosed by Kitahora et al. such that  $R^2 =$  formula (2) such that  $Ar^1 = Ar^4$ ,  $Ar^2 = Ar^5$ ,  $Ar^3 = Ar^6$ , and  $X = Y$ ” and that “further motivation is provided by the fact that additional amino substitution would provide enhanced hole-transporting properties to the carbazole derivative” (pages 5-6, Id.). Similar statements are made with respect to claims 12 and 18 (page 11, Id.) and claim 24 (page 17, Id.). The Applicant respectfully disagrees and traverses the above assertions in the Official Action.

The Applicant respectfully submits that, based on a comparison of Kitahora's carbazole (19) with Richter's carbazole (23), it would not have been obvious to one of ordinary skill in the art at the time of the present invention that “additional amino substitution would provide enhanced hole-transporting properties to the carbazole derivative.”

Also, the Supreme Court in KSR noted that the analysis supporting a rejection under 35 U.S.C. § 103 should be made explicit (KSR International Co. v. Teleflex Inc., 550 U.S. \_\_\_, 82 USPQ2d 1385). The Court quoting In re Kahn (441 F.3d 977, 988, 78

USPQ2d 1329, 1336 (Fed. Cir. 2006)) stated that “[R]jections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” KSR, 550 U.S. at \_\_\_, 82 USPQ2d at 1396. In the present application, the Official Action appears to contain mere conclusory statements, for example, as cited above, and the Official Action has not set forth articulated reasoning with some rational underpinning to support the assertion of *prima facie* obviousness.

Therefore, the Applicant respectfully submits that the Official Action has not provided a proper or sufficient reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Kitahora, Aoki, Matsumoto and Richter or to combine reference teachings to achieve the claimed invention.

In the present application, it is respectfully submitted that the prior art of record, either alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

For the reasons stated above, the Official Action has not formed a proper *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

Paragraph 3 (second occurrence) of the Official Action rejects claims 7-11 and 13-17 as obvious based on the combination of Kitahora, Aoki, Matsumoto and JP 2000-056491 to Kanamaru. The Applicant respectfully traverses the rejection because the Official Action has not made a *prima facie* case of obviousness.

There is no proper or sufficient reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Kitahora, Aoki, Matsumoto and Kanamaru or to combine reference teachings to achieve the claimed invention. MPEP § 2142 states that the examiner bears the initial burden of

factually supporting any *prima facie* conclusion of obviousness. It is respectfully submitted that the Official Action has failed to carry this burden. While the Official Action relies on various teachings of the cited prior art to disclose aspects of the claimed invention and asserts that these aspects could be modified in the manner asserted in the Official Action, it is submitted that the Official Action does not adequately set forth why one of skill in the art would combine the references to achieve the features of the present invention.

The Official Action concedes that "Kitahora et al. does not disclose an inorganic compound to be in the hole-transporting/injecting layer with the carbazole derivative, a fourth layer that contains the carbazole derivative and an inorganic compound, nor a carbazole derivative that meets the limitations of formula (3)" (page 7, *Id.*). The Official Action relies on Kanamaru to allegedly teach a "fluorene derivative capable of hole-transport" and "a particular example" of the same (*Id.*). Without any specific references to Kitahora, Aoki, Matsumoto or Kanamaru in support and without establishing the level of ordinary skill in the art at the time of the present invention, the Official Action asserts that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the amino substituent of the fluorine as disclosed by Kanamaru et al. for the amino substituent as disclosed by Kitahora et al. to produce [see page 8 of the Official Action] such that  $Ar^1$  = aryl group having 6 carbon atoms (phenyl),  $R^1$  = aryl group having 25 carbon atoms (substituted phenyl group), and  $R^2$  = hydrogen" (pages 7-8, *Id.*). Also, the Official Action asserts that "further motivation would be provided by the fact that aryl amines would provide an enhancement of the hole-transporting properties of the compound" (page 8, *Id.*). The Applicant respectfully disagrees and traverses the above assertions in the Official Action.

Kitahora is directed to "new amino compounds ... used as electroluminescent elements," Aoki is directed to an "electroluminescent device and process for producing the same" and Matsumoto is directed to "organic devices, electroluminescent devices, organic solar cells, organic FET structures and production method of organic devices."

However, Kanamaru is directed to a "photoreceptor for electrophotography having a photosensitive layer on a conductive based, the photosensitive layer includes a toluarylamine compound." The Applicant respectfully submits that Kanamaru should be withdrawn from consideration as a reference for modifying any of Kitahora, Aoki and Matsumoto, because Kanamaru's technical field is different from the technical fields of Kitahora, Aoki, Matsumoto. As such, it is not clear why one of ordinary skill in the art at the time of the present invention would look to Kanamaru in order to modify any one of Kitahora, Aoki and Matsumoto.

Also, a substituted position of a carbazole compound is the 3-position. On the other hand, a substituted position of a fluorene compound is the 2-position. Since the substituted positions of the carbazole and fluorene compounds are different from each other, it is not clear why one of ordinary skill in the art at the time of the present invention would look to Kanamaru in order to modify the carbazole compound of any one of Kitahora, Aoki and Matsumoto.

Further, the Applicant respectfully submits that it would not have been obvious to one of ordinary skill in the art at the time of the present invention to obtain the compound shown at page 8 of the Office Action with the molecular structures described at page 7 of the Office Action without a disclosure of a synthesis route of the compound shown at page 8. The Applicant specifically disagrees with the statement that "aryl amines would provide an enhancement of the hole-transporting properties of the compound" or that such enhancement would be obvious to one of ordinary skill in the art at the time of the present invention with only the disclosure of a molecular compound.

Still further, the Official Action appears to contain mere conclusory statements, for example, as cited above, and the Official Action has not set forth articulated reasoning with some rational underpinning to support the assertion of *prima facie* obviousness.

Therefore, the Applicant respectfully submits that the Official Action has not provided a proper or sufficient reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Kitahora, Aoki, Matsumoto and Kanamaru or to combine reference teachings to achieve the claimed invention.

In the present application, it is respectfully submitted that the prior art of record, either alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

For the reasons stated above, the Official Action has not formed a proper *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

Paragraph 5 of the Official Action rejects claims 19-23 as obvious based on the combination of Kitahora, Aoki, Matsumoto and U.S. Patent No. 6,541,129 to Kawamura. The Applicant respectfully traverses the rejection because the Official Action has not made a *prima facie* case of obviousness.

The Official Action concedes that "Kitahora et al. does not disclose an inorganic compound to be in the hole-transporting/injecting layer with the carbazole derivative, a fourth layer that contains the carbazole derivative and an inorganic compound, nor a carbazole derivative that meets the limitations of formula (103)" (page 12, *Id.*). The Official Action relies on Kawamura to allegedly teach "the following compound capable of hole-transport represented by: [see page 12 of the Official Action] (General formula (1), col. 2)" (*Id.*), that "Kawamura et al. discloses a particular example: [see page 13 of the Official Action] (PD-02, col. 7) where the amino substituent attached to the anthracene derivative satisfies structural formula (104)" (pages 12-13, *Id.*) and that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the amino substituent of the anthracene derivative as disclosed by Kawamura



et al. for the amino substituent as disclosed by Kitahora et al. to produce: [see page 13 of the Official Action] such that  $R^1$  = aryl group having 25 carbon atoms (substituted phenyl group), and  $R^2$  = hydrogen" (pages 13-14, Id.). Also, the Official Action asserts that "[t]he motivation would be that the substitution of an amino compound represented by formula (104) produces a compound having a small ionization potential and a large hole mobility, and when used in a light-emitting element, it can provide long lifetimes and decreased driving voltages (col. 1, lines 62-67)" (page 14, Id.). The Applicant respectfully disagrees and traverses the assertions in the Official Action.

The Applicant respectfully submits that it would not have been obvious to one of ordinary skill in the art at the time of the present invention to obtain the compound shown at page 14 of the Office Action with the molecular structures shown at pages 12-13 of the Office Action without a disclosure of a synthesis route of the compound shown at page 8 of the Office Action.

Also, the Applicant respectfully submits that the statement of alleged motivation, i.e. "[t]he motivation would be that the substitution of an amino compound represented by formula (104) produces a compound having a small ionization potential and a large hole mobility, and when used in a light-emitting element, it can provide long lifetimes and decreased driving voltages (col. 1, lines 62-67)" would not have been obvious to one of ordinary skill in the art at the time of the present invention without a synthesis of the amino compound represented by formula (104) and a search of a light emitting device including the amino compound.

Paragraph 7 of the Official Action rejects claims 7-11, 13-17 and 19-23 as obvious based on the combination of Kitahora, Aoki, Matsumoto and U.S. Publication No. 2004/0185299 to Ly. Paragraph 8 of the Official Action rejects claims 12, 18 and 24 as obvious based on the combination of Kitahora, Aoki, Matsumoto, Ly and Richter.

Please incorporate the arguments above with respect to the deficiencies in Kitahora, Aoki, Matsumoto and Richter. Ly does not cure the deficiencies in Kitahora, Aoki, Matsumoto and Richter. The Official Action relies on Ly to allegedly teach the

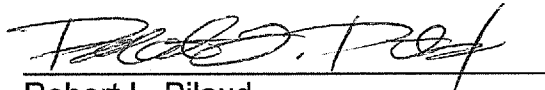
features of the above-referenced dependent claims. However, Kitahora, Aoki, Matsumoto, Richter and Ly, either alone or in combination, do not teach or suggest the following features or that Kitahora, Aoki, Matsumoto and Richter should be modified to include any of the following features: an aryl group having 6 to 25 carbon atoms; general formulas (1) and (2) including an amine; "a carbazole derivative represented by a general formula (1) and an inorganic compound exhibiting an electron accepting property with respect to the carbazole derivative represented by the general formula (1)" and "wherein the inorganic compound is one or more kinds of titanium oxide, vanadium oxide, molybdenum oxide, tungsten oxide, rhenium oxide, ruthenium oxide, chromium oxide, zirconium oxide, hafnium oxide, tantalum oxide and silver oxide." Also, Ly does not explain why, based on a comparison of Kitahora's carbazole (19) with Richter's carbazole (23), it would have been obvious to one of ordinary skill in the art at the time of the present invention that "additional amino substitution would provide enhanced hole-transporting properties to the carbazole derivative"; why one of ordinary skill in the art at the time of the present invention would look to Kanemaru in order to modify any one of Kitahora, Aoki and Matsumoto; why it would have been obvious to obtain the compound shown at page 8 of the Office Action with the molecular structures described at page 7 of the Office Action without a disclosure of a synthesis route of the compound shown at page 8; why it would have been obvious to obtain the compound shown at page 14 of the Office Action with the molecular structures shown at pages 12-13 of the Office Action without a disclosure of a synthesis route of the compound shown at page 8 of the Office Action; or why the statement of alleged motivation, i.e. "[t]he motivation would be that the substitution of an amino compound represented by formula (104) produces a compound having a small ionization potential and a large hole mobility, and when used in a light-emitting element, it can provide long lifetimes and decreased driving voltages (col. 1, lines 62-67)" would have been obvious to one of ordinary skill in the art at the time of the present invention without a synthesis of the amino compound represented by formula (104) and a search of a light emitting device including the amino

compound. Since Kitahora, Aoki, Matsumoto, Richter and Ly do not teach or suggest all the claim limitations and since there is insufficient reason to combine Kitahora, Aoki, Matsumoto, Richter and Ly, a *prima facie* case of obviousness cannot be maintained. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized to charge fees under 37 C.F.R. §§ 1.16, 1.17, 1.20(a), 1.20(b), 1.20(c) and 1.20(d) (except the Issue Fee) which may be required now or hereafter, or credit any overpayment to Deposit Account No. 50-2280.

Respectfully submitted,



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